

U.S. Serial No: 10/551,785
Response to Office Action of April , 2009
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AMENDMENTS TO THE SPECIFICATION:

Please amend the title as follows:

ROTATING PISTON MACHINE WITH DUAL SUSPENSION

AMENDMENTS TO THE SPECIFICATION:

Please amend the specification as follows.

Please amend paragraph [0005] as follows:

[0005] The present invention seeks to eliminate the disadvantages of the current state of technology by providing a machine with the revolving piston that is mounted between a sidewall and a curved circumferential wall of a cylinder in (1) a rotating way around two parallel axes of rotation, which are normal to the side walls of the cylinder, and (2) a sliding way in two directions normal to the axes of rotation and to one another. The rotary piston circumscribes in the cylinder workspaces that have periodically varying volume according to the invention. The rotary piston may be supported by sliding means on a guide ring pivoted in the sidewall in a rotating way around of the axis of rotation. The guide ring may be provided with a bore. A supporting shaft passes through the bore. The rotary piston may be further supported on the supporting shaft for sliding movement normal to the axis of the supporting shaft or in a rotating way on a supporting eccentric member connected with the supporting shaft. Advantageously, the rotating piston can be provided with an inboard sliding element having sliding means for a sliding fit of the rotating piston on the guide ring. Advantageously, the sliding means of the rotating piston can be mutually turned by 90°, and the guide ring can be pivoted in the sidewall in both a rotating and sliding way in a direction normal to the axis of the guide ring. The guide ring can also have an end disinclined from the rotating piston. The end of the guide ring can be provided with a recess that has an additional inner sliding means, the additional inner guiding surface arranged vertically to the guiding surfaces. A guide element may be fitted in a sliding way in the additional inner guiding surface. The guide element can be pivoted in a rotating way in a cylindrical eccentric of the supporting shaft and the cylindrical eccentric and the supporting cylindrical eccentric being

mutually turned one to another by 180°. Yet another advantage is that the space of the sliding element created for movement of the guide ring can be connected with vents for entry and outlet of lubricant and/or coolant. ~~embedded in the cylinder. This machine is characterized by a piston, which is embedded on the supporting shaft either in a sliding way normal to the supporting shaft axis or rotary through the supporting eccentric connected to the supporting shaft. This piston is connected in a sliding way to, at least, one conducting ring, which is embedded on the sidewall or rotary in the sidewall, or optionally in a sliding way towards the supporting shaft normally to its revolving axis. Another aspect of the present invention is that the conducting ring is on its front side indisposed from the piston, perpendicularly to its sliding connection with the piston, connected to the auxiliary glide, which is embedded in a revolving way on the conducting eccentric set to the supporting shaft in a parallel way to the supporting eccentric and rotated by 180 degrees. Where two or more cylinders are arranged one next to the other, the auxiliary glide is formed by the adjacent cylinder piston; herewith the directions of the conducting ring gliding connections towards the individual pistons are normal one to another. According to the last aspect, and of the present invention's significance is that spaces between the sliding elements e.g. sockets or nocks, eventually supporting sliding element on one side and the gliding elements, with advantageous casing or groove on the other side are enclosed and equipped by the vents for inlet and outlet of the lubricant.~~

Please amend paragraph [0007] as follows:

[0007] In Fig. 1, the piston 2 equipped by the slots 3 and 4, which form the sliding elements of the piston 2 is arranged in the curved casing 1. The slots 3, 4 settle the piston 2 on two ~~conducting elements~~ sliding means 5, 6, which are always fixed upon one of the shafts 71, 81

whose axes are parallel. According to Fig. 2 the cylinder casing 1 is enclosed by the sidewalls 11, which shafts 71, 81 are rotary embedded on. Arrangements of the sliding elements 3, 4 and the ~~conducting elements~~ sliding means 5, 6 (at the opposite sides of the piston) and shafts 71, 81 is shown on the Figs. 4 and 5. During the revolving of the pistons 71, 81, the fixed ~~conducting elements~~ sliding means 5,6 (which furthermore revolves the piston through the particular sliding element, e.g. slot) concurrently revolves too. The piston also revolves around the axes 8, 7 through its second sliding element 4, 3, second conducting element 6, 5 and second shaft 81, 71. If the cusps have the same distance from the centre of the piston 2, then both of them follow the same covering curve, which together with connection of both cusps forms two separated spaces.

Please amend paragraph [0008] as follows:

[0008] The concurrent revolving motion of the piston 2 around the parallel axes 7, 8 causes that during motion along the ~~covering~~ casing 1 one of the joins of the piston 2 and ~~covering casing~~ 1 departs, while the other join approaches the covering 1. During revolving around 180 degrees, the space between one join of the piston cusp and the ~~covering casing~~ 1 amplifies from minimum to maximum while the space between the other joins diminishes from maximum to minimum. If the cylinder ~~covering casing~~ 1 and/or the cylinder sidewalls 11 are equipped at one side by an inlet and at the opposite side by an exhaust of the liquid or fluent medium, then this medium begins by revolving of just one of the shafts expels from the space between the ~~covering casing~~ 1 and the piston 2 at one side and sucks out of this space at the other side. The machine then works as a compressor or a pump. If the pressure medium is fed through one side of the cylinder into the space between ~~covering casing~~ 1 and piston 2 then the pressure on the surface restricted by the join of the cusps and width of the piston ~~[[1]]~~ 2 causes force, which eludes the

revolving axis 7 and causes a moment to this axis. This moment revolves the shaft 71 and thereby also revolves the piston 2 and the second shaft 81.

Please amend paragraph [0009] as follows:

[0009] In one particular embodiment of the present invention, just one of the shafts 71, 81 is used as a supporting element embedded in the sidewalls 11, while the other is replaced by the ~~conducting~~ guide ring 72, 82, which is also rotary embedded in the sidewall 11 and which is also equipped by the ~~conducting element~~ sliding means 51, 61 connected to the sliding element 31, 41 in the ~~cylinder~~ piston 2. According to another embodiment of the present invention, the piston itself is rotary embedded, for example, through a bearing on the supporting eccentric member 10, which is arranged on the supporting shaft 91 rotary embedded primarily in both of the sidewalls 11. The supporting shaft 91 passes through the ~~conducting~~ guide rings 72, 82 and its axis lies on the plane formed by axes 7, 8 of the ~~conducting~~ guide rings 72, 82 in the middle distance between them. Eccentricity of the supporting eccentric member 10 is equal to the middle distance between axes 7, 8. Within the revolution of the piston 2 conducted by the ~~conducting~~ guide rings 72, 82 the ~~centre~~ center of the supporting eccentric 10 moves along the same trajectory as the ~~centre~~ center of the piston 2. Piston 2 loading is then fully transmitted by the supporting eccentric member 10 and by the supporting shaft 91, so the ~~conducting~~ guide rings 72, 82 are not under the load of piston pressure. There can be transmitted high piston pressures according to the embodiment shown in Fig. 3 in accordance with the present invention.

Please amend paragraph [00010] as follows:

[00010] According to the present invention in the firstly described aspect of the ~~conducting~~ guide shaft 71 adapted as a supporting shaft, it is possible to embed the ~~conducting~~

guide ring 72, 82 in the sidewall 11, or on the sidewall 11 and also simultaneously in a sliding way against the ~~conducting~~ guide shaft 71 adapted as a supporting shaft. This sliding design can also be made both on, or in the sidewall 11 and together with this sidewall 11. In this case, the supporting shaft 91 or the supporting eccentric member 10 can not be used. Piston loading is then transmitted by the sufficiently dimensioned and both sides embedded guide shaft 71. By variation of the distance between ~~conducting~~ guide ring 72, 82 axes and the ~~conducting~~ guide shaft 71 made as a supporting shaft, there can be fluently, during a machine run, changed both, the ratio of minimal-maximal space between the cusps join and curved covering (and thereby also the volume of the sucked and compressed medium) and also the magnitude of the moment to the revolving axis 7. With an assemblage of, at least, two in this manner machines according to the present invention can be arranged, for example, one as a pump and a second as an engine powered by fluent or liquid medium, both the ratio of revolutions and the ratio of moments of both together connected machines fluently changes during shifting of the ~~conducting~~ guide ring 72, 82 against the shaft 81.

Please amend paragraph [00011] as follows:

[00011] Regarding the supporting eccentric 10 and the supporting shaft 91, there is, according to the present invention, a connected function of both of the ~~conducting~~ guide rings so that, the ~~conducting~~ guide ring 72, 82 is arranged just at one side of the piston 2 and adapted according to the Fig. 6 so that, aside from the ~~conducting element~~ sliding means 51, 61, arranged at the inclined cylinder side, it has, along the disinclined cylinder side, ancillary ~~conducting element~~ sliding means 52, 62, which the glide rotary set on the ancillary eccentric 15 is in the sliding way embedded in. This ancillary eccentric 15 has the same eccentricity as the supporting eccentric 10

and it is firmly arranged on the supporting shaft 91, which is rotated by 180° against the supporting eccentric 10. In this way, both of the ~~conducting~~ guide rings can be jointed into the one from both of the embedded sites. It is clearly seen that from manufacturing reasons, it is more convenient to place the jointed conducting ring on the place of the ~~conducting~~ guide ring 82 i.e., so the ~~conducting element~~ sliding means 61 would be embedded in the sliding element 41 of the piston 2, in a sliding way, perpendicularly to the line joining both of the pistons 2 cusps.

Please amend paragraph [00012] as follows:

[00012] All machines with moving components have many places, which are necessary to lubricate or to cool. With the machine, according to the present invention, it is not necessary to use a separate pump, because it is possible to use, according to the present invention, changing spaces between some mutually moving parts (e.g. between sliding elements 3, 4, 31, 41, or optionally between the glide 14 and the ~~conducting elements~~ sliding means 5, 6, 51, 61, 52, 62 as a pump for a lubricating and/or cooling medium by means of closing these spaces at the sides so that they provide inlet and exhaust vents for the above mentioned medium.) In this manner, not only the usual expensive and heavy pumps can be excluded, but this lubricating, or/and cooling medium can be during pumping inside the machine conducted through places to be cooled, or/and lubricated so that the consumption of these mediums is very small.